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EXAMINER	
PETTITT, JOHN F	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/585,834
Filing Date: July 12, 2006
Appellant(s): LE BOT, PATRICK

Elwood Haynes
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/23/2010 appealing from the Office action mailed 12/28/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

claims 9-11.

It is noted that claim 12 was withdrawn from consideration in the action dated 4/28/2009 and that the Appellant was reminded of this in the final rejection dated 12/28/2009, however, the Appellant has refused to properly label the claim as withdrawn.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office

action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

5,475,980	GRENIER	12-1995
5,379,598	MOSTELLO	1-1995
5,735,142	GRENIER	4-1998

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grenier et al. (US 5,475,980) hereafter Grenier (980) in view of Grenier (US 5,735,142) hereafter Grenier (142). Grenier (980) teaches a process (Fig. 4) for separating air by cryogenic distillation in an installation comprising a double air separation column (1), of which one medium-pressure column (2) operates at a medium pressure, and an exchange line (4) in which: a) air is raised to a high pressure (not shown - column 6, lines 6), wherein said high pressure is at least 5 bar above the medium pressure (of 2); b) one portion (all air entering 4 on left of Fig. 4) of the air is cooled in the exchange line (4) and is then divided into two fractions (that which exits 4 to 8 and 32 hereafter "8a" for stream entering 8 and "32a" for stream entering 32); c) each fraction (8a, 32a) is expanded in a turbine (8, 32); d) intake pressures of the two turbines (8, 32) are at least 5 bar above the medium pressure (column 6, lines 5-20); e) a delivery pressure (exit pressure) of at least one of the two turbines (8, 32) is substantially equal to the medium pressure (column 6, lines 21-22); f) at least one portion of the air expanded in at least one of the turbines (8, 32) is sent to the medium-pressure column (2) of the double column (1); g) a cold booster (7) mechanically coupled to one of the expansion turbines (8) takes in air, which has undergone cooling in the exchange line (4), and delivers the air at a temperature above an intake temperature of at least one of the turbines (32; delivers the air to exchange line 4), and the air delivered by the cold booster (7) is reintroduced into

the exchange line (4) in which at least one portion of the delivered air undergoes pseudo-condensation (interpreted as at least partial condensation; column 6, lines 5-10); h) at least one pressurized liquid (O2) coming from one of the columns (of 1) undergoes pseudo-vaporization (at least partial vaporization) in the exchange line (4) at a vaporization temperature (column 1, lines 60-65), and i) the turbine (32) not coupled to the cold booster (7) is coupled to a booster (33) followed by a cooler (4); and, j) an intake temperature of the cold booster (7) is close to the vaporization temperature of the liquid (O2; since the intake to the cold booster 7 comes from the heat exchange line 4; column 4, lines 30-35).

Grenier (980) does not explicitly teach that the high pressure air is purified or a mixing column in which air from at least one of the turbines is sent. However, purifying an air stream prior to cryogenic treatment is standard practice in air distillation, further providing a further column in which mixing may occur is also standard practice for the purpose of separating further components such as argon. Such is taught by Grenier (142), who teaches that pressurized air is purified in apparatus (5; column 2, lines 44-45) and further teaches that a mixing column (31) is provided (interpreted as a column wherein a gas portion and liquid portion contact one another or a column wherein mixing occurs). Grenier further teaches that Argon is separated (column 4, line 63 - column 5, line 5). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Grenier (980) with the purifier (5) and column (31) of Grenier (142) for the purpose of preparing air for cryogenic treatment to ensure reliability in the installation and for the purpose of

separating argon for sale or use. Thus, the air sent to at least one (8) of the turbines (8, 32) upstream of the mixing column (31 of Grenier (142)) comes from the booster (33) and leaves the booster (33) at a pressure above the high pressure (column 6, line 6). Additionally, air expanded in at least one of the turbines (8, 32) is sent to the bottom of the mixing column (31-Grenier(142)), in order to participate in mass exchange therein (inherent to air sent to column 31 as disclosed is that mass exchange will occur).

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostello (US 5,379,598) hereafter Mostello in view of Grenier (142). Mostello teaches a process for separating air by cryogenic distillation in an installation (Fig. 1) comprising a double air separation column (62), of which one medium-pressure column (64) operates at a medium pressure, and an exchange line (24, 22, 52, 14) in which: a) air is raised to a high pressure (via 12 or 18), wherein said high pressure is at least 5 bar above the medium pressure (of 64), and purified (via 16)*;* b) one portion of the stream of purified air is cooled in the exchange line (24, 22, 52, 14) and is then divided into two fractions (54, 32); c) each fraction (54, 32) is expanded in a turbine (56, 38); d) intake pressures of the two turbines (56, 38) are at least 5 bar above the medium pressure (column 9, lines 5-30); e) a delivery pressure of at least one (38) of the two turbines (56, 38) is substantially equal to the medium pressure; f) at least one portion of the air expanded in at least one (38) of the turbines is sent to the medium-pressure column (64) of the double column (62); g) a cold booster (34) mechanically coupled to one (38) of the expansion turbines (56, 38) takes in air, which has undergone cooling in the exchange

line (24), and delivers the air at a temperature above an intake temperature of at least one (56) of the turbines (56, 38), and the air delivered by the cold booster (34) is reintroduced into the exchange line (24) in which at least one portion of the delivered air undergoes pseudo-condensation (at least partial condensation, column 7, lines 40-45); h) at least one pressurized liquid (O2) coming from one of the columns (of 62) undergoes pseudo-vaporization (at least partial vaporization) in the exchange line (24) at a vaporization temperature (column 8, lines 45-50), and i) the turbine (56) not coupled to the cold booster (34) is coupled to a booster (50) followed by a cooler (52); and, j) an intake temperature of the cold booster is close to the vaporization temperature of the liquid (O2; see Figures 2-3; column 7, lines 1-10; "close" relative term not distinguishable in any absolute sense),

Mostello does not explicitly teach a mixing column in which air from at least one of the turbines is sent. However, providing a further column in which air is sent (and in which mixing may occur) is standard practice for the purpose of separating further components such as argon. Such is taught by Grenier (142), who teaches that a mixing column (31) is provided (interpreted as a column wherein a gas portion and liquid portion contact one another or a column wherein mixing occurs). Grenier also teaches that Argon is separated (column 4, line 63 - column 5, line 5). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the process of Mostello with the column (31) of Grenier (142) for the purpose of preparing air for cryogenic treatment to ensure reliability in the installation and for the purpose of separating argon for sale or use. Thus, the air sent to at least one (56) of

the turbines (38, 56) upstream of the mixing column (31 of Grenier (142)) comes from the booster (50) and leaves the booster (50) at a pressure above the high pressure (from 12 or 18). Additionally, air expanded in at least one of the turbines (56, 38) is sent to the bottom of the mixing column (31-Grenier(142)), in order to participate in mass exchange therein (inherent to air sent to column 31 as disclosed).

(10) Response to Argument

In summary, it is noted that the claim recites that the installation includes a mixing column. It is noted that a mixing column was interpreted as a distillation column wherein mixing occurs. The Appellant has argued that a mixing column should be interpreted as "a countercurrent contact column in which a more easily volatile gaseous fraction is sent opposite a more poorly volatile liquid".

While the examiner believes that this definition is narrower than the broadest reasonable interpretation for the term mixing column, however, for the sake of simplicity, it will be assumed that a mixing column must be a column meeting the Appellant's definition; that is that a *mixing column is a column wherein a gas fraction and liquid fraction contact one another or mass transfer with one another counter-currently.*

In the case of the prior art, the secondary reference - Grenier (142) shows a double column (1) having an auxiliary column (31) wherein a gas fraction (vapor within the column rising towards condenser 34) mass transfers or contacts a liquid fraction (condensed liquid descending within column from condenser 34). Therefore, the column (31) meets the requirements of a mixing column per the Appellant's definition of the term mixing column.

1. Appellant's arguments (page 10, ¶ 3) are that because the specification mentions that there may be a mixing column or may be argon column in the installation in addition to the double column that such reference requires that an argon column may not be a mixing column. In response to the Appellant's arguments, it is noted that the claims do not recite a mixing column alternatively with an argon column. They only require an auxiliary column that is a mixing column. Further, the mention of an argon column and a mixing column as potential auxiliary columns does not define that an argon column may not be a mixing column. It only states that the auxiliary column may be a column that operates to separate argon and that column may be a column that has a gas fraction and a liquid fraction contact one another. Therefore, as can be seen these limitations are not exclusive of one another and therefore the argument should be deemed unpersuasive.

2. Appellant's arguments (page 11, ¶ 2-3) are that there must be two separately entered streams for a column to be considered a mixing column. In response to the Appellant's arguments, the examiner fully disagrees since, as stated above, the broadest reasonable interpretation, as set forth by the Appellant, is that a mixing column is a column wherein a liquid and a gas portion contact one another or mass transfer with one another. Therefore the allegation that a mixing column must have two inlet ports is unpersuasive as there is nothing in the definition of a mixing column requiring that all mixing columns must have two separate inlet ports. Rather, the interpretation of a mixing column as stated by the Appellant is a column wherein a gas fraction and liquid fraction contact one another or mass transfer with one another counter-currently.

Therefore the allegation that no mixing takes place in column (31) is false since Grenier (142) shows an auxiliary column (31) wherein a gas fraction (vapor within the column rising towards condenser 34) mass transfers or contacts a liquid fraction (condensed liquid descending within column from condenser 34).

3. Appellant's arguments (page 11, ¶ 4 - page 12, ¶ 2) concerning the interpretation of mixing column are considered moot since the whole of the rejection still stands assuming the Appellant's interpretation of the term "mixing column" as well as assuming the plain meaning interpretation of the term being that the column has mixing therein, therefore, since either interpretation upholds the rejection, the interpretation that mixing column is *a column wherein a gas fraction and liquid fraction contact one another or mass transfer with one another counter-currently* will be treated.

4. Appellant's arguments (page 13, ¶ 3) appear to be an argument that the interpretation of the term mixing column should rely on the plain meaning of mixing.

In response, it is noted that this position is contradictory to the previous position of the Appellant that the term mixing column should be interpreted as a *column wherein a gas fraction and liquid fraction contact one another or mass transfer with one another counter-currently.* However, presuming the interpretation that a mixing column is a column wherein mixing occurs, it is agreed that mixing does require the co-mingling of two fluids and that there are two such fluids in the column (31) of Grenier (142) that the gas and liquid portions within column co-mingle and contact one another and transfer air components (argon, oxygen, nitrogen) with one another. Further, there is nothing in

the interpretation of mixing column that requires that there must be two separately entered fluids only that there is a mixing of two fluids therein.

Additionally, the allegation that to meet the limitations of a mixing column requires two different streams of two very different compositions is unpersuasive as there is nothing in the meaning of mixing that requires that two portions mixing with one another must be “very different” or of "very different compositions". Certainly two fluids of the same compositions can co-mingle.

Nonetheless it is noted that the liquid and the vapor within the column (31) are of different compositions and that is why there are streams of differing compositions leaving the column -- because some of the constituents preferentially form as vapor and some as liquid. Therefore, in either sense the Appellant’s arguments should be deemed unpersuasive.

Finally, it is noted that the allegation that there is no zone of mixing of two fluids is false since the condenser (34) condenses some portions of fluid that prefer to be liquid and therefore there will be descending liquid contacting with ascending vapor and therefore the interior of the column between the entrance of feed (32) and condenser is a mixing zone wherein gas and liquid will co-mingle and exchange mass.

5. Appellant’s arguments (page 13, ¶ 4) are the repeated allegation that two fluids must enter the column in order for the column to be considered a mixing column. In response to the Appellant’s arguments, the examiner fully disagrees since, the broadest reasonable interpretation, as set forth by the Appellant, is that a mixing column is *a column wherein a liquid and a gas portion contact one another or mass transfer with*

one another. Therefore the allegation is unpersuasive as there is nothing in the definition of a mixing column requiring that the column must have two separate inlet ports.

6. Appellant's arguments (page 13, ¶ 5 - page 14, ¶ 3) are a statement that within an argon column that vapor and liquid do co-mingle and mass transfer with one another as liquid descends and vapor rises. In response to the Appellant's arguments, it is noted that all of these statements support the position of the office.

7. Appellant's arguments (page 14, ¶ 4) that a mixing column in most cases will not have a vaporizer or a condenser. In response to the Appellant's arguments, the examiner disagrees fully as the definition of a mixing column as established as being *a column wherein a liquid and a gas portion contact one another or mass transfer with one another* supports in no way limits the use of vaporizers or condensers. Therefore the allegation should be considered unpersuasive.

8. Appellant's arguments (page 14, ¶ 4) are that "it is entirely different from an air separation column". In response to the Appellant's arguments, the examiner fully disagrees since simply stating that the mixing column is "entirely different" provides no basis or reason to distinguish the mixing column from an air separation column and is not persuasive.

9. Appellant's arguments (page 14, ¶ 4) are that a column is not a vessel that encourages mixing and needs no explanation. In response to the Appellant's arguments, it is noted that the allegation provides no rational or evidence as to why a

vessel that encourages mixing may not meet the requirement of a mixing column and therefore is insufficient to overcome the evidence provided by Grenier (142).

10. Appellant's arguments (page 14, ¶ 5) are that the mass transfer between liquid and vapor within the column (31) is the opposite of mixing since several streams are withdrawn from the column. In response, the examiner disagrees as there is nothing opposite about vapor and liquid co-mingling in the column (31) and the definition of mixing which is that fluids co-mingle.

It is further noted that there is nothing inherent to the definition of mixing or to the interpretation of the term, mixing column, as established, that requires that only one fluid is removed therefrom. The Board should not be swayed by Appellant's assertion that because there are separate streams that leave the column, the column (31) of Grenier (142) is disqualified from being a mixing column since the Appellant's mixing column (300) in Figure 1 has several exiting streams and therefore the argument is contradictory to the specification.

Further the Appellant has repeatedly asserted that the meaning of a mixing column is *a column wherein a liquid and a gas portion contact one another or mass transfer with one another.* It has further been shown repeatedly that such is accomplished by the column (31) of Grenier (142), since within column (31) a gas fraction (vapor within the column rising towards condenser 34) mass transfers or contacts a liquid fraction (condensed liquid descending within column from condenser 34). Therefore, it is inconsistent to now assert that the term mixing column must be interpreted differently based on the plain meaning of mixing.

Regardless, however, it has been shown (in section 4) that assuming the plain meaning of mixing column is a column wherein mixing occurs and that mixing is a co-mingling or blending, Grenier (142) meets the limitation since there is a co-mingling of two fluids in the column (31) of Grenier (142) since the gas and liquid portions within column co-mingle and contact one another and transfer air components (argon, oxygen, nitrogen) with one another.

In regard to the allegation that the column (31) does not qualify because there is no collection or blending of constituents, it is noted that this position is false since there is mass transfer between the liquid and the vapor and therefore, there is explicit and inherent blending of gas and liquid portions within column, which co-mingle and contact one another and transfer air components (argon, oxygen, nitrogen) with one another.

11. Appellant's arguments (page 15) are that the same arguments apply. In response to the Appellant's arguments, the examiner disagrees for the same reasons as relative to the rejection in view of Grenier (980) and Grenier (142)

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/John F Pettitt /
Examiner, Art Unit 3744

Conferees:

/Cheryl J. Tyler/
Supervisory Patent Examiner, Art Unit 3744

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